

## Brief Descriptions of Catalog Items

### Agriculture and Waste Management Technical Working Group

(Recently enacted policies and programs in Washington State are listed where relevant (see italics). Note that this listing is incomplete and will be fleshed out during the TWG process; working group members are encouraged to provide input to the TWG facilitators on existing policies and programs, where relevant.)

#### AW-1 PRODUCTION OF FUELS AND ELECTRICITY

##### 1.1 Expanded Use of Biomass Feedstocks for Electricity, Heat, and Steam Production

Increase the amount of biomass available for generating electricity and displacing the use of fossil energy sources.

*Recent Actions in WA: The 2006 Energy Independence Act (Initiative 937) established renewable portfolio standards. Large utilities (25,000 customers and over) are required to obtain 15% of their electricity from new renewable resources such as solar and wind by 2020 (3% in 2012 -- 9% in 2016 -- and 15% in 2020) and undertake cost-effective energy conservation. The RPSs affect 95% of the electric generation in the State.*

##### 1.2 In-state Liquid Biofuels Production

Increase production of ethanol and/or biodiesel fuel from agriculture and/or forestry feedstocks (raw materials) to displace the use of fossil diesel. Promote the development of cellulosic ethanol technologies and ethanol production systems that use renewable fuels to improve the embedded energy content of ethanol. Increased production and consumption in state give the highest benefits.

*Recent Actions in WA: Washington State has passed into law several requirements and incentives supporting an in-state biodiesel and ethanol industry: HB 1240 to 1243, tax and use incentives to encourage production and use of biodiesel and ethanol; EO 04-06, Sustainability and Efficiency Goals for the State Operations; ESSB 6508, establishing minimum renewable fuel content requirements and fuel quality standards; HB 2939, appropriated \$17 million for the Energy Freedom Loan Program to develop bioenergy R&D, crops, and markets (Agriculture only).*

*Currently the biodiesel production in the State, from 15 facilities on line or in serious planning/development, is about 270.5 million gallons per year. Biodiesel is sold at 35 stations in Washington.*

*Ethanol production is about 435 million gallons per year from seven facilities in the permitting/planning stage. Ethanol is a fuel derived from grain, usually corn, sugarcane or other*

*biomass sources. E-85 can be used in the new Flexible Fuel Vehicles is an 85-percent ethanol/15-percent gasoline blend. There are four E-85 fueling stations in the State.*

### **1.3 Manure Digesters/Other Waste Energy Utilization**

Reduce the amount of methane emissions from livestock manure by installing manure digesters on livestock operations. Energy from the manure digesters is used to create heat or power, which offsets fossil fuel-based energy production and the associated Greenhouse Gas (GHG) emissions.

*Recent Actions in WA: Three anaerobic digester projects were awarded state loans in 2006; the projects are sponsored by the Port of Sunnyside, Tulalip tribes and Mason County, respectively. The projects will convert livestock waste into methane fuel and energy.*

## **AW-2 AGRICULTURE – Livestock**

### **2.1 Manure Management**

Implement manure management practices that reduce GHG emissions associated with manure handling and storage. Potential practices include but are not limited to manure composting (to reduce methane emissions) and improved methods for application to fields (for reduced nitrous oxide emissions). Application improvements include incorporation into soil, instead of surface spray/spreading.

### **2.2 Changes in Animal Feed**

Livestock emit methane directly as a result of digestive processes (enteric fermentation). Research suggests that changes in the energy content of feed and other dietary changes can reduce methane emissions from enteric fermentation. By optimizing nitrogen (protein) utilization in the feed, nitrogen levels in the manure can be reduced, which in turn reduce the potential for nitrous oxide emissions.

### **2.3 Rotational Grazing/Improve Grazing Crops and/or Management**

Heavy grazing can cause significant soil disturbance and result in carbon losses from soils. Rotational grazing where animals are moved from field-to-field on a regular basis reduces soil disturbance and maintains soil carbon levels. Rotational grazing also can improve plant vigor and enhances soil carbon levels.

## **AW-3 AGRICULTURE – CROP PRODUCTION**

### **3.1 Soil Carbon Management**

The amount of carbon stored in the soil can be increased by the adoption of practices such as conservation and no till cultivation. Reducing summer fallow and increasing winter cover crops are complimentary practices that reduce the need for conventional tillage. In addition, the application of biochar (i.e., charcoal) may also increase soil carbon content and stabilize soil carbon. By reducing mechanical soil disturbance, these practices reduce the oxidation of soil carbon compounds and allows more stable aggregates to form. Other benefits include reduced wind and water erosion, reduced fuel consumption, and improved wildlife habitat.

*Recent Actions in WA: The Washington Department of Natural Resources (DNR) has been working collaboratively with various stakeholders to build on the 2005 West Coast Carbon Sequestration Partnership<sup>1</sup> (WESTCARB). DNR and WESTCARB produced an inventory of terrestrial carbon sequestration opportunities in Washington State.*

### 3.2 Nutrient and Water Management

Improve the efficiency of fertilizer use and other nitrogen-based soil amendments through implementation of management practices. Excess nitrogen not metabolized by plants can leach into groundwater and/or be emitted to the atmosphere as N<sub>2</sub>O. By managing and improving water consumption and nutrients spread on crops, there will be a minimal loss of carbon from the soil. Reduced water consumption can result in lower energy use for water pumping. Better nutrient utilization can lead to lower nitrous oxide emissions from run-off.

## AW-4 AGRICULTURE-LAND USE CHANGE

### 4.1 Land Use Management that Promotes Grassland Cover

Convert marginal agricultural land used for annual crops to permanent cover such as grassland/rangeland, orchard, or forest, where the soil carbon and/or carbon in biomass is higher under the new land use. Includes opportunities to keep CRP lands in permanent cover. Increased demand for corn-based ethanol and biodiesel feedstocks can act as an incentive for converting grassland to cropland. Adopt mechanisms to prevent these acres from either returning to conventionally tilled production or to suburban/urban development.

### 4.2 Preserve Open Space/Agricultural Land

Reduce the rate at which agricultural lands are converted to developed uses, while protecting private property rights and responsibilities. This retains the above- and below-ground carbon on these lands, as well as the carbon sequestration potential of these lands. Transportation emissions will be reduced indirectly through more efficient development and lower vehicle use.

## AW-5 AGRICULTURE-FARMING PRACTICES

### 5.1 Reductions in On-Farm Energy Use

Renewable energy can be producing and used on-site at agriculture operations. For example, installation of solar or wind power, use of hydro-powered generators for irrigation, and converting diesel farm equipment to LNG/CNG or hybrid technology will reduce carbon dioxide emissions by displacing the use of fossil based fuels.

*Recent Actions in WA: Renewable Energy System Cost Recovery (RCW 82.16.110) and Tax on Manufacturers or Wholesalers of Solar Energy Systems: provides incentives for the purchase of locally-made renewable energy products.*

*Incentive payments are provided by electric utilities to customers generating renewable energy (i.e., solar, wind) on their property. For example, the Chelan County PUD Sustainable Natural*

<sup>1</sup> For more information, go to the WESTCARB website: [www.westcarb.org](http://www.westcarb.org)

*Alternative Power Producers Program encourages customers to install power generators such as solar panels and wind turbines and connect them to the PUD distribution system.*

*The federal Energy Policy Act of 2005 provided several renewable energy incentives.*

## **5.2 Organic Farming**

Provide incentives to farmers for growing organic products. Organic farming may result in reduced GHG emissions compared to conventional farming, depending on the specific practices implemented (e.g., use of no-till cultivation and fewer chemical inputs).

## **5.3 Programs to Support Local Farming/Buy Local**

Promote the production and consumption of locally-produced agricultural commodities, which displace the consumption of commodities transported from other states or countries. GHG reductions occur from reduced transportation-related emissions.

# **AW-6 WASTE MANAGEMENT – WASTE MANAGEMENT STRATEGIES**

## **6.1 Advanced Recycling and Composting**

Increase recycling and reduce waste generation in order to limit greenhouse gas emissions associated with landfill methane generation and with the production of raw materials.

Increase recycling programs, create new recycling programs, provide incentives for the recycling of construction materials, develop markets for recycled materials, and increase average participation/recovery rates for all existing recycling programs.

## **6.2 Promotion of Bioreactor Technology**

Municipal solid waste can be composted and processed with bioreactor technology. Composting has advantages over land-filling and incineration because of lower operational costs, less environmental pollution, and beneficial use of the end product. Bioreactor technology is also used to accelerate waste stabilization rates, enhance gas production, facilitate leaching, reduce volume, and minimized long-term liability of waste.

## **6.3 Source Reduction Strategies**

Reduce the volume of waste from residential, commercial, and government sectors by including recycling, reuse, and composting. Reduction of generation at the source reduces both landfill emissions as well as upstream production emissions

## **6.4 Resource Management Contracting**

Unlike traditional solid waste service contracts, resource management (RM) compensates waste contractors based on performance in achieving an organization's waste reduction goals rather than the volume of waste disposed. As a result, RM aligns waste contractor incentives with the

goals to explore innovative approaches that foster cost-effective resource efficiency through prevention, recycling, and recovery.

### **6.5 Waste Coal Recapture**

Promote research and implementation of recovering waste coal. Waste coal is a usable material that is a byproduct of previous coal processing operations. Emissions are reduced relative to the mining of new coal.

### **6.6 Prevent Landfilling of Unprocessed Organic Material**

Reduces methane emissions associated with landfilling by reducing the biodegradable fraction of waste emplaced.

## **AW-7 WASTE MANAGEMENT – LANDFILL GAS STRATEGIES**

### **7.1 Flare Landfill Methane at non-NSPS (smaller) sites**

Encourage smaller landfills that do not fall under strict environmental protection regulations to capture and flare methane gas. Flares are used to safely combust toxic and volatile gases from landfills and they convert methane gas, which has a relatively high global warming potential, to carbon dioxide.

### **7.2 Methane and Biogas Energy Programs**

Encourage and promote the use of anaerobic digesters and energy recapture for waste materials other than municipal solid waste at landfills (e.g. food processing waste). These projects will help prevent the emission of methane while producing clean energy. Anaerobic digesters make a two-fold contribution to climate protection: the usual unchecked discharge of methane into the atmosphere is prevented, and the burning of fossil fuels is replaced with an unlimited supply of clean, renewable energy (biogas).

### **7.3 Landfill Methane Energy Programs**

Use the clean, renewable energy created at landfills by anaerobic digesters to make electric power, space heat, and liquified natural gas.

## **AW-8 WASTE MANAGEMENT – WASTE MANAGEMENT STRATEGIES**

### **8.1 Energy Efficiency Improvements**

Provide incentives for efficiency improvements. Encourage the set up of energy policies, energy audits, and energy cost tracking. Identify and implement energy improvements such as using energy efficient equipment and generating on-site power (e.g. solar power).

### **8.2 Lower Waste Processing Needs**

Develop and implement best practices for lowering water consumption and lowering waste production at the industrial, commercial, and residential levels. Encourage and create incentives for research and development on reducing water consumption and waste production. Provide education to reduce water consumption and waste production. Lower water consumption, waste production lead to lower GHG emissions.

### **8.3 Install Digesters and Turbines or Engines**

Provide incentives to install anaerobic digesters to treat municipal waste and create methane. Install turbines or reciprocating engines to generate electricity from the methane. Reductions occur via methane control and offsetting fossil energy use.